

Isoprene is the largest non-methane compound admitted into Earth's atmosphere annually, with its primary source being vegetation. Within the troposphere, isoprene undergoes multi-generation oxidation by hydroxyl radical addition to yield non-volatile products contributing to ambient fine particulates. Isoprene oxidation products, such as isoprene hydroxy hydroperoxides (ISOPOOHs), cannot be isolated in quantity from ambient sources. Therefore, understanding the chemical properties of ISOPOOHs requires synthesis of standards. A specific ISOPOOH of interest to researchers is 1,2-ISOPOOH. In this project, 1,2-ISOPOOH was synthesized in quantity. The synthesis involves an epoxide ring opening with hydrogen peroxide catalyzed by phosphomolybdic acid. After the reaction had concluded, the product was purified by column chromatography and analyzed using ^1H and ^{13}C NMR. The NMR spectra were identical to previously published spectra for 1,2-ISOPOOH. Two major research applications for the synthetic 1,2-ISOPOOH are ISOPOOH-derived atmospheric fine particulates as drivers of climate change and human toxicology studies, specifically studies investigating oxidative stress from inhalation of fine particulates containing ISOPOOH and other highly oxygenated components.